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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF CANNINGTON

COUNTY OF ONTARIO

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Report on a water pollution survey of the village of Cannington in the county of Ontario.

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Report on a

WATER POLLUTION SURVEY

of the

VILLAGE OF CANNINGTON

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Division of Sanitary Engineering

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Report on a

WATER POLLUTION SURVEY

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INDEX

	PAGE NO.
Introduction	1
Previous Surveys by OWRC Staff	1
Interviews with Officials	2
Village of Cannington	2
Water Uses	2
Water Supply	3
Sewage Disposal Facilities	3
Proposals Re Sewage Works	3
Surface Water Drainage	4
Industry	4
Private Outfalls	5
Sampling Procedure	5
Interpretation and Significance of Laboratory Results	5
Sample Results	6
Summary	8
Recommendation	9

APPENDICES

Significance of Laboratory Analyses - pages i to iv, inclusive
Laboratory Results - Tables I to III
Map of the Village of Cannington

WATER POLLUTION SURVEY

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VILLAGE OF CANNINGTON

INTRODUCTION

A water pollution survey of the Village of Cannington was performed by OWRC staff on October 12, 1965. Such studies are focussed primarily on conditions which are existing and potential sources of surface-water pollution. Recommendations are made concerning the abatement of conditions which can adversely affect water quality. The control of surface-water quality is a major responsibility of the Ontario Water Resources Commission. Appended to this report is a map of Cannington showing the locations of sampling points.

PREVIOUS SURVEYS BY OWRC STAFF

The initial water pollution survey of the Village of Cannington was performed by OWRC staff during the period of May 5 to June 25, 1958. The pertinent survey report included the recommendation that the municipal officials should take action either to exclude contaminants from the storm drainage flows discharging to the Beaverton River, or to provide adequate treatment for these flows prior to their discharge to the watercourse.

The original water pollution survey at Cannington was reviewed by OWRC staff on January 17, 1962, and the pertinent report recommended that an initial step in establishing waste treatment facilities would be to procure a preliminary engineering report on sewage works.

INTERVIEWS WITH OFFICIALS

A discussion was held during this recent survey with Mr. G. Brandon, Clerk-Treasurer of the village.

VILLAGE OF CANNINGTON

Cannington is located in the County of Ontario, approximately seven miles east of Lake Simcoe. According to the 1965 Municipal Directory, the population of Cannington was approximately 1,050 during 1964. The area of the municipality is approximately 525 acres.

The Beaverton (Beaver) River flows in a northerly direction through Cannington, although the actual direction of flow varies within the village.

WATER USES

Municipal

The Beaverton River is not utilized for municipal purposes in Cannington except as a receiving water for the discharges from storm sewers.

Industrial

Flows in the river are employed to provide water power at the Cannington Feed Mills and at the John McLachlan Foundry.

Recreational

Recreational use of the Beaverton River is of limited importance in Cannington. The muddy features of this watercourse make it unattractive for bathing purposes.

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WATER SUPPLY

Cannington's municipal water supply is obtained from ground-water sources at two sites located west of the village. The system serves most of the municipality and the Brock District High School which is located west of the village in the Township of Brock. No treatment is provided for these water supplies. Depletion of the supplies has caused the municipality to explore the availability of additional ground water and the OWRC has been providing assistance in this regard.

SEWAGE DISPOSAL FACILITIES

Private septic tank systems are utilized in the absence of municipal sewage works. It is obvious that there are instances where sewage is discharged to the municipal storm sewer system. It is probable that the more critical problems exist in the commercial section of the village where adequate area is less likely to be available for installing effective sub-surface sewage disposal systems. The municipal officials have indicated that some action has been taken to prevent the discharging of sewage to the storm sewer system. Building lots used for the construction of new houses are required to be of adequate area.

PROPOSALS RE SEWAGE WORKS

Realizing the need for public sewage works, the municipal officials have discussed the feasibility of proceeding with such a project, and meetings in this regard have been held with OWRC staff.

The financial expenditure involved has delayed the commencement of a sewage works construction programme. It was reported on October 12, 1965, that action to obtain a preliminary engineering report has been delayed until more information can be obtained concerning the methods of financing such a project. Subsequently, the village officials have contacted the OWRC with respect to the possibility of constructing sewage works as a Provincial project.

SURFACE WATER DRAINAGE

The village is served somewhat extensively by municipal storm sewers and drainage systems which conduct flows to the Beaverton River.

INDUSTRY

The principal industrial firms in Cannington are listed as follows:

Name of Firm	Products
Brock Creamery	Dairy Products
Cannington Block Company	Concrete Products
Cannington Feed Mills	Food Products
Griffith Laboratories Limited	Livestock Food
John McLachlan Foundry	Attrition Grinders

Reportedly, the only industrial plant having a severe industrial waste disposal problem is Brock Creamery, from whence wastewater is discharged to the municipal storm sewers.

PRIVATE OUTFALLS

Although some private outfalls might exist in Cannington, none were revealed during the survey.

SAMPLING PROCEDURE

Water samples were collected from the Beaverton River at three locations on October 12, 1965, to determine the influence exerted thereon by waste discharges in Cannington. Additional samples were obtained from five municipal storm sewer outfalls within the village. The pertinent laboratory results are appended in Tables I and III, respectively, with Table I including the results of samples collected from the river at these points by OWRC staff during the past several years. In Table II are the results of laboratory and field tests pertaining to the quality of the Beaverton River water at the sideroad (sample point number B 12.60) downstream from Cannington. This information has been obtained by the OWRC water-quality monitoring programme.

An extensive period of rainfall occurred on the date of this survey. The maximum atmospheric temperature was approximately 50 degrees Fahrenheit.

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

The analyses employed to determine the quality of samples were: biochemical oxygen demand (BOD), solids, turbidity, nitrogen, and tests for detergents as ABS. Bacteriological examinations were performed to enumerate coliform organisms. The field tests

associated with the OWRC water-quality monitoring programme included the determination of dissolved oxygen. A copy of the interpretation of the various analyses and examinations employed is appended to this report.

SAMPLE RESULTS

The laboratory results are shown in appendices to this report as follows:

Table I - Beaverton River at Cannington
Table II - Beaverton River at Sideroad Downstream from Cannington (Water-Quality Monitoring Information)
Table III - Municipal Outfalls to Beaverton River at Cannington.

Table I - Beaverton River at Cannington

The laboratory results indicate that the quality of the Beaverton River water has been generally satisfactory at sample point number B 15.68 which is located upstream from Cannington at Concession Road 10 in the Township of Brock. One set of laboratory results revealed a slightly high BOD at this location. With respect to the nitrogen evaluation performed on samples collected at this location on October 12, 1965, the free ammonia was moderate and the total Kjeldahl nitrogen was slightly high as might be anticipated when a heavy rainfall was causing surface run-off in the watershed. The coliform content of the river at this location has been within OWRC objectives according to the sample results.

The excessive coliform content revealed at Cameron Street (sample point number B 14.18) in Cannington during this survey is

attributed to the discharge of sewage from municipal storm sewers within the village.

Downstream from the municipal storm sewer outfall at Laidlaw Street North, the quality of the river water (sample point number B 12.38) was adversely affected by the waste discharges within the village. The BOD was slightly in excess of the desirable limit and the coliform content was excessive. The free ammonia and total Kjeldahl values were high at this location during the recent survey, thus indicating the significance of these analyses as parameters of water quality.

Table II - Beaverton River at Sideroad
Downstream from Cannington

This sample point (B 12.60) is located approximately 0.78 miles downstream from Laidlaw Street North in Cannington and was selected for the OWRC water-quality monitoring programme because it would show the quality of the watercourse after reasonable recovery of the stream quality should have occurred with respect to the waste discharges in Cannington. The BOD of the water at this location exceeded the OWRC objective slightly during three of ten dates of sampling. The high free ammonia and total Kjeldahl values revealed in most instances, when compared with the relatively low nitrate values, indicate that aerobic decomposition of the nitrogenous material had not been completed. The concentration of coliforms tended to vary at this location. The dissolved oxygen content was satisfactory.

Table III - Municipal Outfalls to Beaverton River at Cannington

The laboratory results reveal the presence of untreated or inadequately treated sewage in the discharges from four municipal storm sewer outlets to the Beaverton River in Cannington. The pertinent sample point numbers are: B 13.39 W, B 14.57 W, B 14.59 W and B 14.69 W.

A municipal storm sewer extends along the south side of Cameron Street West and conducts flows in a westerly direction. This sewer discharges to a ditch near the intersection of the county road and the first sideroad west of Cannington in Concession 12, Township of Brock. These flows then pursue a northerly course in a ditch which extends to the Beaverton River within the township. It is likely that these flows gain access to the river downstream from the water-quality monitoring point (B 12.60). The flows in the sewer which extends along Cameron Street West were sampled at the sewer outfall and the laboratory results indicate the presence of untreated or inadequately treated sewage.

SUMMARY

A water pollution survey of the Village of Cannington was performed by OWRC staff on October 12, 1965. These investigations were made to review conditions revealed during previous surveys in 1958 and in 1962.

Although Cannington is served by a municipal water works system, municipal sewage works have not been provided. Consequently,

sewage flows are discharged either to private sub-surface sewage disposal systems or to municipal storm sewers. All of the discharges from the storm sewer systems gain access to the Beaverton (Beaver) River. The laboratory results indicate that untreated or inadequately treated sewage was present in all of the storm sewer discharges, and that the quality of the river water deteriorated as it flowed through Cannington.

Obviously, public sewage works are required at Cannington in order that the discharging of inadequately treated sewage to the Beaverton River can be discontinued. The municipal officials are aware of the need for municipal sewage works and are willing to give active consideration to initiating such a project when the method of financing can be resolved.

RECOMMENDATION

The provision of municipal sewage works at Cannington should be actively considered in order to exclude untreated or inadequately treated sewage flows from the Beaverton River.

Approved by: L. South

L. G. South,
Acting District Engineer,
Division of Sanitary Engineering.

Prepared by: R. G. Barrens

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SIGNIFICANCE OF LABORATORY ANALYSES

Biochemical Oxygen Demand

The BOD of sewage or polluted waters is the oxygen required during stabilization of the decomposible organic or chemical material by aerobic biochemical action. A five-day BOD determination with incubation at 20 degrees Centigrade is reported. It is the opinion of the OWRC that the BOD of a watercourse should not exceed four parts per million (ppm).

Solids

The analyses for solids include tests for total, suspended and dissolved solids. The results are reported in ppm. The first test measures both the solids in solution and in suspension. The suspended solids value indicates the measure of undissolved solids of organic or inorganic nature in suspension. Significant sources of suspended solids are sewage, industrial wastes and land erosion. Suspended solids in water can present difficulties in water purification, and might result in deposits in streams which can interfere with the habitat of aquatic life. The dissolved solids are a measure of those solids in solution.

Turbidity

Turbidity is a measure of the optical properties of fine suspended solids such as clay, silt and finely divided organic matter which cause light to be scattered or absorbed rather than to be transmitted in straight lines through the sample of water. The results are reported in turbidity units. When suspended solids

values approach 20 ppm or less, the values of suspended matter are usually determined as turbidity.

Nitrogen

Nitrogen determinations were performed in some instances to ascertain the nitrogen content of the Beaverton River. Ammonia nitrogen, which sometimes is called free ammonia, is the soluble material produced in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia might be used in appraising free ammonia content.

Low	-	0.015 to 0.03 ppm
Moderate	-	0.03 to 0.10 ppm
High	-	0.10 or greater

Total Kjeldahl nitrogen is a measure of the total nitrogenous material present except that which is measured as nitrite and nitrate nitrogens. The total Kjeldahl nitrogen less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen values are important in determining the availability of nitrogen for biological utilization. The normal range for total Kjeldahl nitrogen is 0.1 to 0.5 ppm.

Nitrite nitrogen is usually an intermediate oxidation product of ammonia. The significance of nitrite varies with the amount, source and relationship to other constituents of the sample, notably the relative magnitude of ammonia and nitrate present. Since nitrite is rapidly and easily converted to nitrate, its

presence in concentrations greater than a few thousandths of one part per million is generally indicative of active biological processes in the water.

Nitrate nitrogen is the final product of aerobic decomposition of nitrogenous matter, and its presence implies this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that might be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility. The following ranges in the concentration of nitrate serve as a guide:

Low	-	less than 0.1 ppm
Moderate	-	0.1 to 1.0 ppm
High	-	greater than 1.0 ppm

Detergents

The presence of anionic detergents as alkyl benzene sulfonate (ABS) usually is an indication that domestic waste is present.

Coliform Count

The coliform count is employed to enumerate the coliform organisms present in the sample. The presence of coliform indicates pollution by human or animal excrement, or by some non-faecal forms. The number of coliforms is reported per 100 millilitres (ml) of the sample. The membrane filter technique was used in the examination of these samples. It is the opinion of the OWRC that the presence of coliforms in a watercourse should not exceed 2,400 organisms per 100 ml. of water.

Dissolved Oxygen

The amount of dissolved oxygen contained in unpolluted water fluctuates with the temperature. A deficiency of oxygen is replaced by solution of oxygen from the atmosphere. The saturation values vary according to temperature. Values below the saturation level indicate the presence of polluting organic substances which utilize the dissolved oxygen in the water. The extent of oxygen deficiency is one index of the degree of organic pollution. A substantial reduction in dissolved oxygen can cause fish to suffocate.

The temperature of water influences the solubility of oxygen and the rate of oxidation and purification.

TABLE I

BEAVERTON RIVER AT CANNINGTON

SAMPLE POINT NUMBER	DESCRIPTION	DATE OF SAMPLE	5-DAY BOD	SOLIDS			NITROGEN AS N		BACTERIOLOGICAL EXAMINATION
				TOTAL	SUSP.	DISS.	FREE AMMONIA	TOTOL KJELDAHL	COLIFORMS/100 ML
B 13.38	BEAVERTON RIVER APPROXIMATELY 150 FEET DOWNSTREAM	JAN. 17/62	4.7	356	---	---			11,000
	FROM LAIDLAW STREET NORTH	OCT. 12/65	4.8	326	42	284	0.23	1 00	980,000
B 14.18	BEAVERTON RIVER AT CAMERON STREET EAST	OCT. 12/65	1.5	256	5	251	---	---	49,000
B 15.68	BEAVERTON RIVER AT CONCESSION RD. 10 (TWP. OF BROCK)	JUNE 23/58	3.0	222	20	202	---	---	1,080
	- UPSTREAM FROM CANNINGTON (SAMPLING POINT NOT	JAN. 17/62	6.0	358	--	---	---	---	30
	SHOWN ON MAP)	SEPT.21/62	---	---	--	---	---	---	600
		SEPT.16/63	---	---	--	---	---	---	230
		OCT. 12/65	1.8	282	4	278	0.06	0.64	410

NOTE: ALL ANALYSES EXCEPT PH REPORTED IN PPM UNLESS OTHERWISE INDICATED

TABLE II

SAMPLE POINT NUMBER - B 12.60 BEAVERTON RIVER AT SIDEROAD DOWNSTREAM FROM CANNINGTON

DATE OF SAMPLE	DESCRIPTION	5-DAY BOD	SOLIDS TOTAL	SOLIDS SUSP.	SOLIDS DISS.	TURBIDITY	NITROGEN AS N FREE AMMONIA	NITROGEN AS N TOTAL KJELDAHL	NITRITE	NITRATE	DISSOLVED OXYGEN	TEMPERATURE IN DEGREES C.	BACTERIOLOGICAL EXAMINATION COLIFORMS/100 ML
DEC. 2/64	BEAVERTON RIVER AT SIDEROAD	2.8	---	9	---	1.8					13.2	1	970
JAN. 22/65	DOWNSTREAM FROM (WEST OF)	5.1	502	18	484	5.0					8.8	1	1,080
FEB. 19/65	CANNINGTON	4.5	190	7	183	1.5					9.2	0.5	420
MAR. 19/65		5.0	298	71	227	9.0					8.6	1	380
MAY 14/65		1.7	252	8	244		0.12	0.91	TR	0.51	12.6	15	12,000
JUNE 17/65		1.8	272	2	270	2.9	0.28	1.20	TR	TR	7.9	18	900
JULY 9/65		1.3	238	3	235	1.1	0.08	0.65	TR	0.15	11.2	23	700
JULY 29/65		1.8	262	7	255	6.0	0.20	0.84	0.01	0.00	10.8	20	160
AUG. 18/65		1.8	256	4	252	3.5	0.12	1.10	0.01	TR	9.0	21.5	2,400
SEPT. 17/65		0.3	282	1	281	8.0	0.08	1.00	TR	TR	10.0	16.0	630

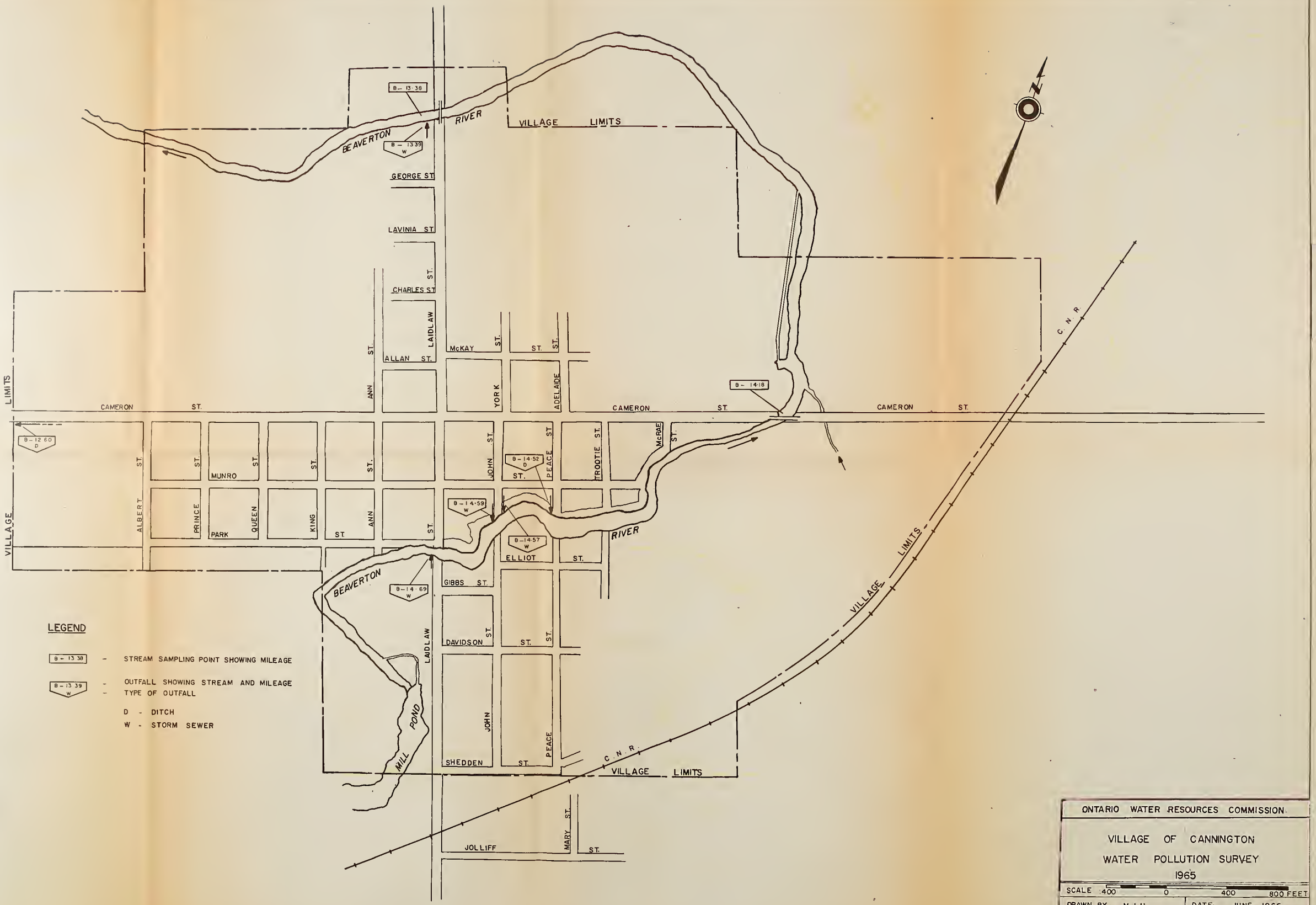
NOTE: ALL ANALYSES EXCEPT PH REPORTED IN PPM UNLESS OTHERWISE INDICATED.

TABLE III

MUNICIPAL OUTFALLS TO BEAVERTON RIVER AT CANNINGTON

SAMPLE POINT NUMBER	DESCRIPTION	DATE SAMPLED	5-DAY BOD	SOLIDS TOTAL	SOLIDS SUSP.	SOLIDS DISS.	ANIONIC DETERGENTS AS ABS	BACTERIOLOGICAL EXAMINATION COLIFORMS/100 ML
B 13.39 W	STORM SEWER OUTFALL ON SOUTH BANK OF BEAVERTON RIVER - WEST SIDE OF LAIDLAW STREET NORTH	OCT. 12/65	15.0	510	274	236	0.4	9,300,000
B 14.52 D	DITCH TERMINATING ON NORTH BANK OF RIVER AT WEST SIDE OF PEACE STREET	OCT. 12/65			NO	FLOW		
B 14.57 W	STORM SEWER OUTFALL ON NORTH BANK OF RIVER AT EAST SIDE OF ST. JOHN STREET	OCT. 12/65	148.0	602	232	370	7.0	500,000,000
B 14.59 W	STORM SEWER OUTFALL ON NORTH BANK OF RIVER AT WEST SIDE OF ST. JOHN STREET	OCT. 12/65	---	---	---	---	---	223,000
B 14.69 W	STORM SEWER OUTFALL ON SOUTH BANK OF RIVER AT WEST SIDE OF LAIDLAW STREET SOUTH	OCT. 12/65	310.0	900	198	702	2.4	380,000,000
B 12.60 D	DITCH RECEIVING FLOW FROM SEWER ON SOUTH SIDE OF CAMERON STREET WEST AND EXTENDING UP SIDEROAD TO BEAVERTON RIVER - SAMPLED AT END OF SEWER WEST OF VILLAGE	OCT. 12/65	23.0	400	100	300	2.1	2,260,000

NOTE: ALL ANALYSES EXCEPT PH REPORTED IN PPM UNLESS OTHERWISE INDICATED.



LEGEND

B – 13 38 – STREAM SAMPLING POINT SHOWING MILEAGE

B – 13 39 W – OUTFALL SHOWING STREAM AND MILEAGE – TYPE OF OUTFALL

D - DITCH

W - STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

VILLAGE OF CANNINGTON

WATER POLLUTION SURVEY

1965

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